Meeting Minutes (Draft)

For the 11th Experts Meeting on IHRA Pedestrian Protection
26-28 June 2002, Holiday Inn Capitol, Washington DC, USA

Day 1 (Wed. 26 June)

1. Opening of the meeting

The chairperson, Mr. Mizuno, opened the meeting and expressed his appreciation for the arrangements made by NHTSA. In his opening remarks, the chairperson noted that several important decisions were made since the last IHRA Pedestrian Safety (IHRA/PS) meeting. He also said that these decisions seem to affect our activity.
The first decision was approval of the proposed new terms of reference of this working group by the IHRA Steering Committee (IHRA/SC); this means that we need to keep the time schedule.
The second decision was very influential. WP29 decided to develop the Global Technical Regulation (GTR) for pedestrian safety as their highest priority. GRSP, a working party of WP29, decided to establish An Ad-hoc working group, and the first meeting was scheduled in September 2003.
The chairperson said that the main task of this working group (IHRA/PS) is to support the GTR development. Therefore, we must accelerate our activity and provide much useful information to the Ad-hoc committee.

The chairperson asked all IHRA/PS members to work diligently to accelerate this activity.

2. Roll call of delegates

(See Appendix 1.)
The chairperson welcomed all of the IHRA/PS experts and the following new attendants.
Mr. Cesari, successor to Mr. Janssen.
Mr. Hahn, technical assistant to Mr. Ries.
Mr. Stammen, technical assistant to Mr. Donnelly.
Mr. Konosu, technical assistant to Mr. Ishikawa and recorder.
Mr. Hirai and Ms. Wizer, the secretariat of this meeting.

3. Adoption of the meeting agenda

The draft agenda (IHRA/PS/213) was approved with the following change.
A subitem about the technical feasibility was added in Item 6.

4. Approval of draft minutes from the 10th meeting

The following typing errors were found in the second day's discussion:
- Page 3, line 15, "+1 standard deviation" should be corrected to "+/- 1 standard deviation."
- Page 3, line 27, "+1 standard deviation" should be corrected to "+/- 1 standard deviation."
- Page 3, line 55, "+1 standard deviation" should be corrected to "+/- 1 standard deviation"

The above corrections were agreed upon without comment.

5. IHRA Steering Committee meeting

5.1. IHRA/PS 2001 report

The IHRA Steering Committee stated that the IHRA/PS 2001 report was a good example for other IHRA working groups. The chairperson thanked all of the IHRA/PS experts for their contributions.

5.2. New Terms of Reference

The new terms of reference of this working group, updated at the last IHRA/PS meeting, were approved by the IHRA Steering Committee without any modification. However, the IHRA Steering Committee seemed to have some interest in active safety.

5.3. ESV 2003

The information of the ESV 2003 conference suggested that the ESV conference is scheduled on 19-22 May 2003 in Nagoya, Japan. The chairperson was appointed as a session chairperson for "Improved Safety for Vulnerable Road Users" and requested all experts to submit excellent pedestrian safety papers for that session.

6. Adult/Child Head Test Procedures

6.1. Computer Simulation Results

NHTSA and RARU finished their additional simulation, and JARI tried to combine all of the simulation results before this meeting. However, the results differed significantly from others.
Mr. Konosu (JARI) presented all the simulation results (PS215) on behalf of the three institutes. He noted the following unusual simulation results.
1) Too hard contact. (Pelvis flies into the air.)
2) Over-Penetration. (Contact failure occurs.)
3) Excessive joint stiffness (ex. AM50 joint stiffness for a six-year-old child).
4) Negative impact angle.
After the presentation, the RARU and NHTSA representatives commented as follows.
Mr. McLean (RARU) said that the impact angle is too sensitive, and that is why the negative impact angle seems to be observed. He also said that the walking position is a sensitive matter, therefore the walking stance seems to affect to the simulation results.
Mr. Donnelly (NHTSA) mentioned that the three institutes' results for WAD are very similar, but the other impact conditions are quite different. He does not know the reason, but he said that Mr. Stammen was trying to develop a ranking formula to check the model's biofidelity.
Mr. Cesari mentioned that the vehicle model differs slightly for each institute (ex. size of element and shape of the bottom), and this may cause the differences in simulation results.
Mr. Konosu said that the differences of pedestrian models is a very serious problem and may affect simulation results.
The chairperson suggested that we spend a couple of years for this simulation analysis. Of course, the Ad-hoc committee will begin its activities soon, so he wants some conclusions from this analysis.

Finally, the chairperson proposed that the three institutes discuss this matter after this meeting (Day 1 meeting) and requested that the institutes obtain some conclusion, even if only a tentative one.
The representative of the three institutes agreed

6.2. Development of IHRA spec Adult and Child Head-form Impactor by NHTSA

Mr. Stammen presented the development of an IHRA specification adult and child head-form impactor by NHTSA (PS216). Basically, the Head-form impactors satisfy the IHRA requirement except for the moment of inertia.
Mr. Hahn recommended that Mr. Stammen check the value of the first natural frequency of their impactor (recommend value is over 5000Hz).

6.3. Discussion between ACEA and FTSS/TNO about the tolerances of the Head-form Impactor

Mr. Ries summarized the discussion between ACEA and TNO/FTSS about the tolerances of the head-form impactor (PS217). The discussion purpose is to reduce the dispersion of the test results.
Mr. Ries received some recommendations (ex. accelerometer position: the Center of Sphere (CS) +/- 1mm), but they needed further discussion with FTSS about this.

6.4. Influence of the Tolerance of the Accelerometer Location on the Test Results

Mr. Konosu reported on the influence of the tolerance of the accelerometer location on the test results (PS218). From his presentation, the tolerance of the accelerometer along the measurement axis (CG +/-10mm) does not affect the test results, but the tolerance of the accelerometer along to the non-measurement axes may significantly affect the test results.
The conclusions were as follows.
(1) Location of Accelerometer (X):
X-axis, CG +/- 10mm; Y-axis, CG +/- 2.5mm; and Z-axis, CG +/- 2.5mm
(2) Location of Accelerometer (Y):
Y-axis, CG +/- 10mm; X-axis, CG +/- 2.5mm; and Z-axis, CG +/- 2.5mm
(3) Location of Accelerometer (Z):
Z-axis, CG +/- 10mm; X-axis, CG +/- 2.5mm; and Y-axis, CG +/- 2.5mm

Mr. Lawrence proposed that to define these values from CS, however, above the proposal was approved theoretically and allowed to be a tentative conclusion of this matter.
The chairperson asked all of the experts to investigate the technical feasibility of these values by the next meeting. These values will be finalized if found technically feasible.

Conclusion (Tentative)
(1) Location of Accelerometer (X):
X-axis, CG +/- [10]mm; Y-axis and Z-axis, CG +/- [2.5]mm
(2) Location of Accelerometer (Y):
Y-axis, CG +/- [10]mm; X-axis and Z-axis, CG +/- [2.5]mm
(3) Location of Accelerometer (Z):
Z-axis, CG +/- [10]mm; X-axis and Y-axis, CG +/- [2.5]mm
All of the experts need to investigate the technical feasibility of these values by the next meeting.

6.5. Influence of the Tolerance of the CG Location on the Test Results
Mr. Konosu reported the influence of the tolerance of the CG location on the test results (PS219). From his presentation, the tolerance of CG from the Center of Sphere (CS) along any direction (CS +/- 7.5mm) may significantly affect the test results.
The conclusion is as follows.
Location of the CG: CS +/- 2mm (in any direction)

The proposal was approved theoretically and allowed to be a tentative conclusion of this matter.
The chairperson asked all of the experts to investigate the technical feasibility of these values by the next meeting. These values will be finalized if found technically feasible.

Conclusion (Tentative)
(1) Location of the CG:
CS +/- [2]mm (in any direction)
All of the experts need to investigate the technical feasibility of these values by the next meeting.

6.6. Influence of the Tolerance of the Drop Test Corridor on the Test Results
Mr. Konosu reported the influence of the tolerance of the drop-test corridor on the test results (PS220). From his presentation, the tolerance of the drop-test corridor (Adult Head forms 225 to 275(G), Child Head form 245 to 300(G)) does not affect the test results if the impact level is HIC 1000 or lower, such as in bonnet contact without bottoming. However, the test results could be affected under more severe impact conditions, such as HIC2000 or higher. Therefore, the corridor should be narrower if it is technically feasible.
Mr. McLean said that this study clarified that the influence of skin is negligible on the HIC1000 level or lower, therefore, the skinless head-form impactor can be used for HIC of 1000 or lower.
Mr. Donnelly agreed with Mr. McLean's opinion.
Mr. McLean mentioned that the skinless head-form impactor was discussed in the ISO pedestrian meeting.
Mr. Ishikawa said that the skinless head-form impactor may generate high vibration and that the friction might change.
Mr. Lawrence said that the skinless head-form imapctor cannot pass the drop test requirement. The drop test is a sort of biofidility test and therefore cannot be omitted.
Mr. Riese showed that the ISO documents (ISO/N475) mention the HIC difference with and without a skin impactor.
Mr. Ishikawa said that JARI conducted the test but that the test method was totally different from the current one (guided impact), and therefore the test results cannot be used directly.
Mr. Tanahasi said that the difference between the skin and skinless impactors can be observed from the documents, so the skinless head-form impactor cannot be allowed.
Mr. McLean said the skin and calibration test costs were high, so testing with the skinless impactor is better.

The chairperson concluded that we need more study results on this and requested all the experts to study this more and discuss this matter again at the next meeting.

Conclusion
All the experts need to study the influence of the head-form skin by the next meeting.

Day 2 (Thu. 27 June)

6.1. Computer Simulation Results, cont. (Results of Discussion among JARI, NHTSA and RARU)
JARI, NHTSA and RARU plus Mr. Laurence discussed the computer simulation result after the first day's meeting and concluded the following (PS221).
1) For the Current Tentative Conclusion
Make a graph without the results as follows.
 1.1) Strange Kinematics (Pelvis flies into the air.)
 1.2) Over-Penetration
 1.3) Improper joint stiffness (AM50 joint stiffness for six-year-old child)
 1.4) Negative impact angle
2) For Further Study
 2.1) Select a base model (JARI model is approved).
 2.2) The three institutes will modify the base model.
 2.3) After the modification, a new computer simulation will be conducted and the current test conditions updated.
The three institutes' conclusion above was approved without any changes.

Conclusion
1) For the Current Tentative Conclusion
Make graph without the results as follows.
 1.1) Strange Kinematics (Pelvis flies into the air.)
 1.2) Over-Penetration (Contact failure)
 1.3) Hard joint stiffness (AM50 joint stiffness for six-year-old child)
 1.4) Negative impact angle
2) For Further Study
 2.1) Select a base model (JARI model is approved).
 2.2) The three institutes will modify the base model.
 2.3) After the modification, a new computer simulation will be conducted and the current test conditions updated.

After the conclusion, Mr. McLean proposed to Mr. Konosu to delete the "Effective Head Mass Ratio" graph from our tentative conclusion, because the equation of the "Effective Head Mass" does not consider the each component's vector, force and acceleration, therefor the obtained the "Effective Head mass" is inappropriate value.
Mr. Donnelly and Mr. Konosu agreed his proposal and decided to delete the "Effective Head Mass Ratio" graph from the current computer simulation results.

Conclusion
Delete the "Effective Head Mass Ratio" graph from the current computer simulation results.

After the above discussion, Mr. Lawrence and Mr. Bilkhu requested to use the base model.
Mr. Konosu insisted that we need to limit shared use of the base model because the purpose of supplying the JARI model as an IHRA base model is to improve the current model and to obtain more precise test conditions using the improved pedestrian model.
Mr. Lawrence and Mr. Bilkhu agreed with his opinion and stated that if they use the base model, they would be sure to contribute to the model development.

Conclusion
The purpose of sharing the base model is to improve the current model and to obtain more precise test conditions using the improved pedestrian model. Therefore, researchers desiring to use the base model should contribute to its development.

After the above argument, another argument occurred.
Mr. McLean asked how we should recommend the simulation data for a regulation. In particular, the Japanese government seems to need our recommendation because they are scheduled to issue a Japanese pedestrian regulation by March 2003. Mr. McLean recommended using the average + 1 SD for the regulation because more pedestrians can be saved than when using the average value or below.

Mr. Lawrence and Mr. Donnelly supported Mr. McLean's comment.
The other members were opposed because the current simulation results are just tentative results, and therefore we should not recommend a strict value like the average + 1 SD. The other members recommended that we just show the average +/- 1 SD, and they insisted that the final decision should be up to a regulator.
The argument between the average + 1 SD group and the average +/- 1 SD group continued.
Based on this argument, the typing errors found in the 10th IHRA minutes ("average + 1 SD" should be changed to "average +/- 1 SD."

Finally, the chairperson proposed recording both opinions in the minutes and the preamble of simulation results.
The chairperson's proposal was agreed upon without any comment, and the chairperson asked Mr. Donnelly to make a preamble of the simulation results referring to this discussion.

Conclusion
Record both opinions in the minutes and the preamble of simulation results as follows.
Opinion 1: Average + 1 SD should be used for the regulation.
Opinion 2: Test conditions should be decided from the average +/- 1 SD by a regulator.

6.7 WAD
On behalf of OICA, Mr. Ries presented the lower limit of the test area (PS222).
His presentation is summarized as follows.
(1) There are very few pedestrian head contacts under WAD1000mm.
(Source: ISO/TC22/SC10/WG2 N428)
(2) EEVC concluded that WAD1000 is a lower limit for the child head-form tests based on their computer simulation results.
(3) The WAD distribution shows that the most impacts occur above WAD 1000 mm.
(Source: ISO/TC22/SC10/WG2 N184)
(4) The COG height of a six-year-old child's head, the most risky child, is over 1000 mm.
(Source: ISO/TC22/SC10/WG2 N517)
(5) Most of the AIS 2-6 injuries of pedestrians (< 16 years old) result from hitting the bonnet top.
(Source: IHRA accident data)
(6) The technical feasibility of the child head-form impact test area below WAD 1000 mm has not been assessed.
(7) Most vehicles' WAD 900 mm line is close to the head lamp assembly area, and the HIC value of a child head-form test will be influenced only by the inertia effect of the head lamp.
(Source: ESV 2001)
(8) Therefore, the lower limit of the child head-form test area should be fixed at WAD 1000 mm.

The chairperson stated that we discussed the transition zone of the test area in the 8th IHRA/PS meeting but that we did not have a serious discussion about the lower and upper limits of the test area.
Mr. Stammen reviewed the PS186 document used for the previous discussion and confirmed the summary of contents as follows,

"According to PS186, when a stature of 166 cm (the average height of a US 15-year-old person) was used as a cutoff between child and adult cases, the minimum WAD was 1000 mm for the child cases when only 0 to 30 km/hr vehicle speeds were included and the lower 10% of cases was discarded. When the age of 15 was used as the cutoff, 900 mm was the minimum WAD when only 0 to 30 km/hr vehicle speeds were included and the lower 10% of cases was discarded."

Mr. Cesari proposed the following new idea for the test area.
(1) Gather all WAD distribution data and discard the lower and upper 10% from that.
(2) Separate the WAD distribution data by age or height to decide the 3.5kg and 4.5kg head-form test area.

However, Mr. Lawrence argued that there are few children. Therefore, we need to pay special attention to the lower limit if we discard WAD data,.

The chairperson stated that this discussion could not be concluded at this time, but we could get some useful information, i.e. a summary of PS 186 and the lower limit of EEVC and ISO.

The chairperson proposed that the current lower limit (900mm) be entered in brackets and that the summary of PS186 and the information related to the EEVC and ISO lower limits be recorded in the minutes.

Mr. Mclean and Mr. Lawrence argued that we should not put the current lower limit in brackets because they could not find the reason for that even though they agreed to describe the detailed information of the lower limit in the minutes.

Finally, the chairperson proposed the following.
At this moment, we will just enter the detailed information about the lower limit of the test area in these minutes, but we can discuss it again if we receive additional information or useful data in the future.

The chairperson's proposal was agreed upon without comment.

Conclusion
Information for the lower limit of the test area is as follows.
(1) According to PS186, when a stature of 166 cm (the average height of a US 15-year-old person) was used as a cutoff between child and adult cases, the minimum WAD was 1000 mm for cases involving children when only 0 to 30 km/hr vehicle speeds were included and the lower 10% of cases was discarded. When the age of 15 was used as the cutoff, 900 mm was the minimum WAD when only 0 to 30 km/hr vehicle speeds were included and the lower 10% of cases was discarded.
(2) The lower limit of the test area of EEVC and ISO test method is WAD 1000mm.

Mr. Ries continued his presentation about the entire bonnet as a child head-form test area (PS223).
His presentation is summarized as follows.
(1) Relief ratios of the overlap method and the boundary line method do not differ significantly. (Source:IHRA/PS210)
(2) The kinematic factor (WAD / pedestrian height) is about 1.3 at 40km/h, and this translates into a WAD of 2100 mm for small adults (about 1.62m).
(3) A 3.5kg impactor mass represents small adults and children.
(4) The average sum of LEH and bonnet length is 1620mm for sedans and 1260mm for van-type vehicles. Threfore, it seems that most vehicles would be tested with the 3.5kg impactor.
(5) From the point of view of the technical feasibility, using two head-form impactors (3.5kg and 4.5kg) leads to an extra under bonnet clearence compared to designing with one impactor only (3.5kg).
(6) From the point of view of enviromental issues, the extra bonnet clearence will increase fuel consumtion due to more air drag, so more CO_2 will be generated (more pollution).
(7) For the above reasons, the whole bonnet should be tested with the 3.5kg head-form impactor that represents children and small adults

Mr. Tanahashi said that half of this presentation relates to technical feasibility. He therefore proposed including the part on technical feasibility in Annex G (Section for the Technical Feasibility from OICA).
The chairperson fully agreed with Mr. Tanahashi's proposal. Also, the chairman said that it would take 10 years or more to discuss the technical feasibility in this meeting and reach a conclusion because car manufacturers say they cannot while others just say they can.
The chairperson proposed just putting the technical feasibility opinions into Appendix G, and he said that these opinions will be considered in the GTR discussion.

Mr. Tanahashi also said that half of the presentation is about technical feasibility but the other part is not, and that therefore these parts should be respected (ex. the comparison of the relief ratio between the boundary line method and the overlap method).
Mr. Lawrence said that he want to insist that the difference of the boundary line method and the overlap method is insignificant but that the overlap method provides a higher protection level than the boundary line method.

Mr. Hahn showed the bonnet deformation on the screen, and he insisted that the bonnet deformation is large and wide and that therefore the boundary line area need not be tested by both head-form impactors.
Mr. Lawrence argued that the EEVC explained the necessity of boundary line impacts by both head-form impactors because two different head masses could impact around the boundary area. He also stated that, because of impacts by both head-form impactors at the boundary line, the boundary line method can be nearly as effective as the overlap method.

Finally, the chairperson suspended above discussion, and he proposed the following.
(1) The technical feasibility part of PS223 should be described in Appendix G.
(2) The remaining part of PS223 can stay as it is in PS223 in the same way as for other IHRA PS documents.
The above chairperson's proposal was agreed upon without any comment.

Conclusion
(1) The technical feasibility part of PS223 should be described in Appendix G.
(2) The remaining part of PS223 can stay as it is in PS223.

6.8 Technical Feasibility from OICA
On behalf of OICA, Ms. Brun-Cassan presented the technical feasibility from the OICA (PS224) viewpoint as follows.
(1) The technical feasibility of solutions was never assessed, and no car, even the most recent ones, using the best currently available techniques, could meet the EEVC requirements (from a review of EuroNCAP results). Therefore, there are strong reasons to think that there is a serious problem linked to the feasibility of solutions complying with these proposed requirements.
(2) Consistently and confidently passing a legislative requirement like HIC less than 1000 at a head-impact velocity of 40km/h and a padding-type solution (car bonnet) seems to be out of reach. State of the art solutions to pass an HIC of less than 1000 at impact velocities of 25 to 29 km/h are airbags or other new developments.
(3) Research institutes attempted to design bonnets according to EEVC/WG17 procedures and requirements. All studies were based on the following common strategies.
   1. Provision of sufficient clearance between the bonnet and hard spots underneath, either through the use of a revised packaging, or by assuming availability of an active bonnet.
   2. Amendment of properties of bonnet skin and design to maximize chances of getting good HIC, all other things being equal.
   3. In some cases, changes in other functional properties of the bonnet due to the above modifications were assessed, and some efforts were devoted to preserving these functional properties. In other cases, the compromise used was clearly oriented to meeting HIC requirements with unreasonable solutions.
   4. All the above actions were mainly dedicated to the bonnet surface, but it is clear that there are major difficulties linked to designing elements such as the bonnet hinges and latches that must both meet their functional requirements and be pedestrian friendly.
(4) To reliably and confidently meet HIC 1000 below 1000 at 40km/h is physically impossible with classical solutions. They have been demonstrated to fail, and there is little hope that they would pass in the future.
(5) The only solution, if requirements are left as they are, is to implement external air bags. These airbag systems need to have reliable sensor techniques to make sure that the airbag will work correctly, i.e. inflation in time, considering pedestrian stature and weight, and without faulty inflation. These techniques are not available now nor will not they be in the near future.

The chairperson appreciated the OICA comments, and PS224 was allowed to be Appendix G of the next IHRA/PS report (not the IHRA/PS 2001 report because the deadline of the IHRA/PS 2001 report has passed).
The chairperson also terminated discussion of this among the OICA members and others because it would just lead to an argument. The chairperson further stated that, fundamentally, the discussion of the technical feasibility is an Ad-hoc committee matter. Therefore, this working group would just submit several technical feasibility papers to the Ad-hoc committee.

Everybody agreed with the chairperson's opinion.

The chairperson also said that anyone with a comment on technical feasibility should submit a paper.
Mr. Lawrence stated that he has a technical feasibility paper (continued in the next section).

6.9 Technical Feasibility from Mr. Lawrence

Mr. Lawrence presented the optimization results of the Honda Civic (PS225). He described the test results of the Honda Civic and the results for the modified Honda Civic, called the Lawrence Civic in this meeting. He summarized the test results as follows.

(1) Tests of the Honda Civic show that overall it achieves about 80 percent of the pedestrian protection recommended by EEVC WG 17.
(2) Tests of the Honda Civic show that it easily meets the protection requirements of the first phase of the Negotiated Agreement with ACEA.
(3) TRL's modifications to the Civic's bonnet to wing edge joint improved results, reducing the HIC from 2023 to 1216 at one site and from 1775 to 1507 at the second. Measurements of the available crush depth show that there is room for further improvements.
(4) The TRL modifications to improve the bonnet to wing edge joint were considered to be compatible with existing manufacturing methods, to have no detrimental effect on the vehicle's functionality and have very low additional costs.

The chairperson appreciated Mr. Lawrence's comments and allowed them to be an appendix of the next IHRA/PS report. He also terminated discussion about this between Mr. Lawrence and the OICA members for the same reasons as in Item 6.8.

7. Adult Leg-Test Procedure

The chairperson initiated the discussion of the leg-test procedure.

7.1 Target of the Vehicle Speed

The chairperson proposed the same target vehicle speed as for the head-form test, i.e. 30 to 50km/h.
Mr. Bilkhu asked if we needed to make a decision now or later.
The chairperson wanted to decide the target speed even if it is a tentative one.
Everybody agreed with a target speed of 30 to 50km/h.

Conclusion
The target vehicle speed for the leg-form test is 30 to 50km/h.

7.2 Type of the Leg-form Test

The chairperson proposed the component test for the leg-test procedure rather than a full-scale dummy test because of the test simplicity.
Mr. Lawrence said that we have much experience in component leg-form testing, therefore the component test procedure seems good. If we need to consider the upper body mass, we can just put an upper body mass on a leg-form impactor. He also said that if we combine the upper body part with the leg form, we do not need to consider the test conditions for an upper leg-form test.

Mr. Cesari pointed out the term "component test" is not suitable for representing the leg-form test. The component test is much simpler than the leg-form test, so the term "subsystem test" is more suitable. The term "subsystem test" represents more biomechanical aspects or systematic aspects, as discussed in the previous ISO BIO meeting.
Everybody agreed to use the term "subsystem test" and accepted the test type of the leg-form test as a subsystem test.

Conclusion
The leg-form test was decided to be a subsystem test.

7.3 Target of Protection Parts

The chairperson asked which parts we should focus on as the protection parts of this test.
Mr. Cesari insisted that areas below the pelvis, especially a child's pelvis, should be included.
Mr. Ishikawa said that the body parts that impact the bonnet leading edge, such as a child's chest, should be considered.
Mr. Cesari said that the leg and chest differ from biomechanical aspects and that therefore the leg-form test cannot be used to estimate children's chest injuries.

The chairperson reviewed the beginning of this IHRA/PS activity. This working group first analyzed the available accident data, and decided the parts to be protected and their priorities.
The first priorities were the adult head, child head and adult leg. The second priorities were the chest, upper leg and pelvis. Therefore, the adult leg seems to be better to set as our first priority.

Finally, the chairperson proposed that we focus on the adult leg (femur and below) while considering the side effects to the other parts, especially for children.
Everybody agreed to the chairman's proposal without any modification.

Conclusion
We will focus on the adult leg (femur and below) while considering the side effects on other parts, especially for children.

7.4 Others
The chairperson requested all IHRA members to study the leg-form test procedure by the next IHRA meeting.

Day 3 (Fri. 28 June)

6.1 Computer Simulation Results, cont. (Preamble of the Simulation Results)
Mr. Donnelly and Mr. Stammen presented a preamble of the simulation results as directed by the chairperson on Day 2.
The preamble was approved (PS226) after long time discussion with miner modifications of some expressions

8. Up-to-date information on pedestrian safety by the governments and industries

EU (Mr. Cesari):
Discussion of the Voluntary Agreement (VA) is heading towards finalization in the EU, and the EEVC was ordered to finalize the certification testsrequirements. The EU parliament considered that the VA is just a first step for the pedestrian safety, and they think that the second step of the VA is needed.
WP29 decided to start the GTR making pedestrian safety their first priority, and to establish an Ad-hoc working group under the GRSP.
The Ad-hoc WG was ordered to prepare written justification for the GTR by the end of 2003 and to develop complete and detailed recommendations by the end of 2005.

US (Mr. Donnelly):
NHTSA conducted research on
Developing a head-form impactor,
Modifying chapter 3 of the IHRA/PS 2001 report,
Performing additional computer simulation, and
Reconstructing pedestrian accidents using the POLAR dummy (SAE2002).

NHTSA is also trying to develop a ranking system for pedestrian models.
The priority of pedestrian safety regulations is low, however some interests are against the GTR. Mr. Saul will attend the GTR Ad-hoc meeting, but there is no schedule to adapt the GTR for a US regulation.

JMLIT (Mr. Ishikawa):
JMLIT is scheduled to issue a pedestrian safety regulation for pedestrian head protection by March 2003. The regulation will be applied to the bonnet area, and its purpose is to reduce pedestrian fatalities. The draft will be published around the end of this summer.

Australian Government (Mr. McLean):
RARU conducted an accident reconstruction using computer simulations and subsystem tests. RARU is also trying to conduct an accident reconstruction analysis by using the POLAR dummy.

A sled test facility will be constructed within a month, so RARU will be able to contribute more to this activity.

EEVC (Mr. Cesari):
EEVC/WG17 will resume its activity after the end of summer, and Mr. Cesari was selected as the new chairperson of the working group. Basically, their activity is finalizing the EEVC/WG17 1998 report and developing some other new test methods, such as a head-form impact test against the windshield. The research activity will be close to that of this IHRA/PS working group.

JAMA (Mr. Tanahashi)
JAMA did not know the details about the Japanese regulation but is worried about its technical feasibility.
The first is for SUVs or small trucks. These vehicles' outer parts need stiffness to endure tough usage. For pedestrian safety, however, these outer parts need to be soft, which is a kind of contradiction.
The second is the extra clearance at the boundary zone of child and adult head-form test area. The boundary zone must satisfy both head tests, therefore extra clearance is needed beneath the bonnet. Basically, current vehicles tend to reduce the engine space to increase the cabin space. Therefore, it is very tough for automobile manufacturers to get the extra clearance under the boundary zone.

ACEA (Mr. Ries)
ACEA has tried to solve the head-from (2.5kg, 3.5kg and 4.8kg), available from the FTSS/TNO, requirements (accelerometer position, CG position and certification corridor) with FTSS/TNO.
ACEA has also held continuous meetings with DG enterprise about the Voluntary Agreement (VA). In July, ACEA plans to meet with DG enterprise again; JAMA and KAMA are invited.

AAM (Mr. Bilkyhu)
AAM focused on the VA and also Japanese regulation, and is concerned about their technical feasibility.
AAM also started pedestrian safety research and will therefore contribute to this working group in the near future.

9. Others (Problem of Boundary Zone)
Mr. Ishikawa described the problem of the boundary zone as follows.
(1) The current test method forces manufacturers to make some extra clearance underneath the boundary zone between the child head-from test area and adult head-from test area, but it is caused from use just to use only two head-form impactors, i.e. 3.5kg and 4.5kg.
(2) Pedestrian head mass probably correlates with the pedestrian height, therefore the boundary zone could be a 4.0kg head-form test area.
(3) The current test procedure uses only two, 3.5kg and 4.5kg, head-form impactors. Therefore, extra clearance, needless extra clearance in the real world, is needed. It is thus an artificial extra clearance.
(4) If only the two 3.5kg and 4.5kg, head-form impactors in this test method continue to be used, the "artificial" extra clearance should be avoided by some counter measures.

Mr. Lawrence argued that the head mass does not correlate with pedestrian height. For example, tall children have light head mass and short adults have heavy head mass. Therefore, the boundary zone needs to be impacted by both impactors.
Mr. Tanahashi said that in Japanese pedestrian accident data the number of pedestrians hitting their heads at the boundary zone, i.e. WAD 1500mm or so, is quite small. He also said the strange phenomenon should be solved by some counter measures.
Mr. Cesari mentioned that we need to check the relationship between head mass and height carefully but the head mass seems to be related to height more than age.
The chairperson said that a test procedure has been developed based on the accident data but interpreting the accident data for the test procedure is difficult. He also said that this matter seems to include two kinds of aspects, political aspects and technical aspects. Therefore, this seems to be a GTR discussion matter.

Finally, the chairperson proposed that we discuss again this matter if we receive additional information or useful data in the future.

Everyone agreed with the chairperson's proposal without any comment.

Conclusion
We will discuss the boundary zone matter again if we can get some new ideas or new data.

10. Next meeting date and venue
Next meeting: 20-22 Nov. 2002, Adelaide, Australia.
(On 19 Nov. 2002, Mr. McLean is scheduled to hold a seminar on pedestrian safety.)

11. Adjournment
The chairperson thanked all members for attending and adjourned the meeting.

Appendix 1
Attendees at IHRA Pedestrian Safety WG11th Meeting, 26-28, June, 2002

Name	Organization	Address	Tel	Fax	E-mail
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